

SECTION 237200

ENERGY RECOVERY VENTILATOR SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes:
 - 1. Energy recovery ventilators.

1.3 ACTION SUBMITTALS

- A. Product Data: For energy recovery ventilator units, include the following:
 - 1. Complete fan performance curves for Supply and Exhaust Air, with system operating conditions indicated, as tested in an AMCA Certified Chamber.
 - 2. Energy wheel performance data for both Summer and Winter operation.
 - 3. Sound performance data for Supply and Exhaust Air, as tested in an AMCA Certified chamber.
 - 4. Motor ratings, electrical characteristics and motor and fan accessories.
 - 5. Dimensioned drawings for each type of installation, showing isometric and plan views, to include location of attached ductwork and service clearance requirements.
 - 6. Estimated gross weight of each installed unit.
 - 7. Installation, Operating and Maintenance manual (IOM) for each model.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

- A. Coordinate equipment layout and installation with adjacent Work, including lighting fixtures, HVAC equipment, plumbing, and fire-suppression system components.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

1.8 ENERGY RECOVERY VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Greenheck: www.greenheck.com
 2. Loren Cook: www.lorencook.com
 3. Spinnaker: www.spinnakerindustries.com.

1.9 MANUFACTURED UNITS

- A. Unit shall be fully assembled at the factory and consist of an insulated metal cabinet, a curb assembly, energy wheel, an outdoor air intake weather hood with bird screen, a motorized intake damper, a motorized exhaust damper, supply air blower assembly, an exhaust air blower assembly, and electrical control center. All specified components and internal accessories factory installed and tested and prepared for single-point high voltage connection.

1.10 CABINET

- A. Materials: Formed, double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
1. Outside casing: 18 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish. Pre-painted components as supplied by the factory shall have polyester urethane paint on 18 gauge G60 galvanized steel. Base rail is 12 gauge, galvanized (G90) steel.
 2. Internal Assemblies: 24 gauge galvanized (G90) steel except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.
- B. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.
1. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.
 2. Thickness: 1 inch (25 mm)
 3. Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
 4. Location and application: Floor of each unit shall be insulated with fiberglass insulation. Entire interior of unit shall be insulated.
- C. Access panels: Unit shall be equipped with insulated removable access panels to provide easy access to all major components. Access panels shall be fabricated of 18 gauge steel. Removable access panels shall incorporate a formed drip edge.
- D. Control center / connections:
1. Unit shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections.
- E. Energy Wheel:
1. Energy wheel shall be of total enthalpy, rotary air-to-air type, and shall be an element of a removable energy wheel cassette. The cassette shall consist of a galvanized steel framework, an energy wheel as specified, and a motor and drive assembly.
 2. The wheel shall have removable media for servicing.
 3. The wheel shall be capable of economizing sequence..
- F. Motorized Inlet/Exhaust Air Dampers: to be of low leakage type and shall be factory installed.

- G. Sensors: are considered to be part of various optional operational modes or device controllers and are to be factory supplied and installed.
- H. Curb Assembly: Refer to section 230548 for curb requirements. The installing contractor shall be responsible for coordinating with roofing contractor to ensure curb unit is properly flashed to provide protection against weather/moisture penetration. Contractor shall provide and install appropriate insulation for the curb assembly.
- I. Frost Control: shall be timed exhaust. Control system shall include an outdoor air thermostat and pressure sensor on the wheel assembly to initiate frost control sequence.

1.11 SUPPLY AND EXHAUST AIR BLOWER ASSEMBLIES

- A. Blower section construction, Supply and Exhaust Air: Drive motor and blower shall be assembled onto a minimum 14 gauge galvanized steel platform and must have neoprene vibration isolation devices, minimum of 1-1/8 inches thick.
- B. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower, and capable of modulating fan speed control based on analog input signal
- C. Centrifugal blower housing: Formed and reinforced steel panels to make curved scroll housing with shaped cutoff.
- D. Forward curved blower (fan) wheels: Galvanized or aluminum construction with inlet flange and shallow blades curved forward in direction of airflow. Mechanically attached to shaft with set screws.
- E. Blower section source quality control: Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating".

1.12 MOTORS

- A. Refer to Section 230512, "Common Motor Requirements for HVAC Equipment."
- B. UNIT CONTROLS
 - 1. Sensors to be provided with the unit:
 - a. CO2 sensor in the return duct from the space served, upstream of outside air supplies.
 - b. Dirty Filter Sensors – For Outdoor Air Inlet and Exhaust Air filter.
 - c. Outdoor Air Thermostat – for initiation of frost control sequence.
 - d. Energy Wheel mounted pressure sensor – for initiation of frost control sequence.
 - e. Motorized damper position feedback to BAS.
 - 2. Control center shall include 24V control transformer, magnetic motor starter with overload protection, disconnect switch, distribution terminal strip and factory wiring for single point power connection.
- C. FILTERS
 - 1. Unit shall have 2" thick MERV-8 throwaway filters for the outdoor air intake, and exhaust air inlet. Filters shall be located upstream of the energy wheel. and shall be accessible from the exterior of the unit. Filters shall have differential type pressure sensor capable of signalling dirty-filter alarm to BAS.

PART 3 EXECUTION

1.13 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

1.14 INSTALLATION

- A. Install energy recovery ventilator units in accordance with manufacturer's installation instructions.

1.15 CONNECTIONS

- A. Install piping with clearance to allow service and maintenance.
- B. Connect ducts according to requirements in Section 233300 "Air Duct Accessories." Install flexible connectors on makeup air supply duct.
- C. Provide electrical connections.

1.16 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Tests and Inspections:
 - 1. Test each equipment item for proper operation. Repair or replace equipment that is defective, including units that operate below required capacity or that operate with excessive noise or vibration.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Prepare test and inspection reports.

1.17 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain energy recovery ventilator units. Refer to Section 017900 "Demonstration and Training."

END OF SECTION